Cardiovascular Disease: Exploring the barriers to lifestyle modification in a Cape Town setting.

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Declaration

By submitting this research assignment electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the authorship owner thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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Abstract

Introduction

Cardiovascular disease (CVD) is a growing problem worldwide and is the second highest cause of death in South Africa. It can be avoided by controlling modifiable risk factors such as blood pressure, food consumption and exercise. However, many people seem to struggle with modifying and maintaining a healthy lifestyle.

Methods

The aim of this study was to explore the barriers to lifestyle modifications experienced by persons identified at moderate risk for CVD in the Blaauwberg suburb of Cape Town.
One-on-one semi-structured telephonic interviews, guided by an interview schedule, were conducted with eleven participants. Thematic data analysis was performed.

Findings

Individuals conveyed a vague understanding of heart disease. However, it was enough to encourage lifestyle modification. Modifiable risk factors revealed in this study included eating habits, physical activities, and smoking. Three themes emerged from the findings: CVD *"You can prevent it"*, Lifestyle modification *"It just feels like an insurmountable task"*, A better lifestyle *"It's all about self-awareness, self-love."* Information gathered on the barriers/facilitators for the risk factors (above) was further categorized into sub-headings including Health and quality of life, Physical environment, Sociocultural factors, Access to information and resources, and Psychological factors.

Conclusion

Barriers that occur repeatedly include time, financial constraints, and support. Safety concerns when exercising, the availability of free exercise equipment in parks and free organised group physical activities are elements specific to SA.

Key words

Lifestyle modification, Risk Factors, Cardiovascular Disease.

Abstrak

Inleiding

Kardiovaskulêre siektes (KVV) is 'n groeiende probleem wêreldwyd en is die tweede grootste oorsaak van sterftes in Suid-Afrika. Dit kan vermy word deur aanpasbare risikofaktore soos bloeddruk, voedselverbruik en oefening te beheer. Dit lyk egter asof baie mense sukkel om na ‘n gesonde lewenstyl te verander en te handhaaf.

Metodes

Die doel van hierdie studie was om die hindernisse vir lewenstylveranderinge te ondersoek wat deur geïdentifiseerde persone met 'n matige risiko vir CVS, in die Blaauwberg-voorstad van Kaapstad ondevind word. Een-tot-een semi-gestruktureerde telefoniese onderhoude, gelei deur 'n onderhoudskedule, is met elf deelnemers gevoer. Tematiese data-analise is uitgevoer.

Bevindinge

Individue het 'n vae begrip van hartsiektes gehad. Dit was egter genoeg om lewenstylverandering aan te moedig. Veranderlike risikofaktore wat in hierdie studie geopenbaar is, het eetgewoontes, fisieke aktiwiteite en rook ingesluit. Drie temas het na vore gekom uit die bevindinge: CVD "Jy kan dit voorkom", Lewenstylmodifikasie "Dit voel net soos 'n onbegonne taak", en 'n beter leefstyl “Dit gaan alles oor selfbewustheid, selfliefde." Inligting wat oor die hindernisse / fasiliteerders vir die risikofaktore (hierbo) versamel is, is verder ingedeel in onderopskrifte, waaronder gesondheid en lewenskwaliteit; fisiese omgewing, sosio-kulturele faktore, toegang tot inligting en hulpbronne, en sielkundige faktore.

Afsluiting

Hindernisse wat herhaaldelik voorkom sluit tyd, finansiële beperkings en ondersteuning in. Bekommernisse oor veiligheid tydens oefening, die beskikbaarheid van gratis oefentoerusting in parke en gratis georganiseerde groepsfisiese aktiwiteite is spesifieke elemente vir SA.

Sleutelwoorde

Lewenstyl verandering, Risiko faktore, Kardiovaskulêre siekte.

List of Acronyms

BMI – Body Mass Index

CAD – Coronary Artery Disease

CHD – Coronary Heart Disease

CVD – Cardiovascular Disease

LMI – Lifestyle modification Intervention

DM – Diabetes Mellitus

DoF – Department of Health

HSFSA – Heart and Stroke Foundation of South Africa

IHD – Ischemic Heart Disease

SA – South Africa

SES – Social Economic Status

WHF – World Heart Federation

WHO – World Health Organisation

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1. Introduction

Cardiovascular disease (CVD) is a growing epidemic worldwide. It is the number one cause of death globally (Mensah, 2013; Thomas *et al*, 2018; Chan *et al*, 2019;). The World Health Organisation (WHO) (2011) estimated it is responsible for 31% of deaths annually. In South Africa (SA) CVD is the second leading cause of death after HIV/AIDS. It is responsible for 18.4% of all deaths (Stats SA, 2017). Ischemic heart disease (IHD) and Stokes were the leading causes of death between 2010-2015 in individuals aged between 25-64 years (Massyn *et al*, 2017).

CVD directly effects the economy of SA by increasing the burden on the health care system. Additionally, the economy is indirectly affected by labour loss, this can be due to two primary causes: Individuals no longer working due to disease or individuals who surrender work to become primary caregivers (Gaziano, 2007; Sivadasanpillai *et al*, 2014).

CVD is responsible for increasing morbidity and disability globally. Some of the impairments associated with the risk factors of CVD include: Pain, neuropathy, visual and hearing impairment, wounds that do not heal on the lower extremities resulting in amputation, mental disorders, atherosclerosis, heart attacks, and strokes (Messerli *et al*, 2018; Papatheodorou *et al*, 2018; CDC, 2020; WHO, 2021). Prolonging or preventing the onset of CVD, can reduce the burden of disease at individual and population level (Sivadasanpillai *et al*, 2014; Fiogbé, 2017).

Two to three percent of SA's Gross National Income, or 25% of the health budget is targeted at combating Non-Communicable Diseases (Gaziano *et al*, 2007). The indirect costs (such as transport, medication, and loss of income) are estimated to be double this. Mendis and Chestnov (2013), and Khanji *et al* (2018) established that there are substantially greater economic and individual health benefits from promoting healthy behaviours, rather than medically treating conditions associated with unhealthy behaviours.

The WHO (2011) indicated three strategies to combat CVD, these include population wide public health strategies (screening, food and beverage policies, tobacco policies), lifestyle modification (which is often the responsibility of the individual), and pharmacological treatment for individuals at high-risk. It is recommended that individuals at low-moderate risk reduce their risk for CVD through lifestyle modification (WHO, 2007; Piepoli *et al*, 2009; Mensah, 2013; Sacco *et al*, 2016;

Reamy *et al*, 2018; Mitchell *et al*, 2019). Behavioural changes such as cessation of smoking, increased physical activity, and reduced body weight are key to reducing the risk of CVD (Cecchini *et al* 2010; Mensah, 2013; Mayosi 2015; Glezeva *et al*, 2018).

1.1 Risk for cardiovascular disease

Khera *et al* (2016) concluded that genetics and lifestyle influence the risk for CVD. However, these two are not mutually exclusive. Individuals not genetically predisposed to CVD can acquire CVD through unhealthy lifestyle behaviours. Furthermore, individuals genetically predisposed for CVD can reduce the risk for CVD through healthy lifestyle behaviours. There is no evidence that lifestyle behaviours will eliminate CVD entirely, however it can postpone the onset of disease, and allows a longer lifespan free of the burden of disease.

The modifiable risk factors for cardiovascular disease as stipulated by Mensah (2013), The World Heart Federation (2019) and Sacco *et al* (2016) are:

- Hypertension: Systolic reading of >140mmHg or diastolic reading of >90mmHg
- Glucose intolerance: Fasting glucose reading of >5mmol/L or non-fasting glucose reading of >7.9mmol/L
- Total cholesterol: > 5mmol/L
- Body Mass Index (BMI): > 25 Kg/m²
- Waist circumference: > 88cm for females or > 102cm for males
- Physical inactivity: < 150 minutes moderate intensity exercise per week
- Smoking and “second-hand smoke”: exhibit the same impact on the risk for CVD
- Nutrition: diet high in fat and salt, with little fruit, vegetables, and fibre intake

Hypertension is widely acknowledged as the leading risk factor for CVD. According to the Heart and Stroke foundation of South Africa (HSFSA, 2019) up to 45% of adult South Africans suffer from hypertension. The Western Cape has the highest prevalence of hypertension in the country (52% of woman and 59% of men). Thirty-one percent of the Cape Town population has hypertension (Massyn *et al*, 2017).

There is a strong correlation between Diabetes Mellitus (DM) and CVD. People identified with DM are twice as likely to develop CVD compared to those without DM (Mitchell *et al* 2019). Similarly hypercholesterolemia is linked to CVD by causing atherosclerosis of the blood vessels (Johnston *et al*, 2017; Wand and Xu, 2017). Physical activity and healthy eating have been proven to control cholesterol and DM, hence lifestyle is paramount to the prevention of CVD (Wang and Xu, 2017).

Poor nutrition coupled with inactivity can result in obesity, DM, and CVD. In SA 68% of women and 31% of men are overweight or obese (Mensah 2013). Additionally, a large portion of the population eat a diet high in processed meat, salt, sugar, deep fried foods, refined starches, saturated fats, trans fats, and cholesterol, and low in fruits, vegetables, and fish (HSFSA, 2019). This type of diet is estimated to cause 31% of coronary heart disease and 11% of strokes worldwide (WHF, 2021). Sampson *et al* (2013) established that people lack awareness of the connection between obesity with DM and CVD in Sub-Saharan Africa. In contrast Taylor *et al* (2020) conducted a survey in Italy, showing only 54% of participants reported concern about future health conditions related to their current obesity.

Physical inactivity is associated with obesity, diabetes, and CVD (Mayosi 2015; Sampson *et al*, 2013; Glezeva *et al*, 2018, Mensah, 2013). One in two SA women and a quarter of men are physically inactive (HSFSA, 2019). BMI and waist circumference are used independently or combined to stratify risk for CVD (Song-Ming *et al*, 2010). Studies suggest that persons with an acceptable BMI (< 25kg/m^2), but large waist circumference (men > 102cm; women > 88cm) present a higher risk for CVD and mortality (Koster *et al*, 2008; Czernichow *et al*, 2011)

Smoking is estimated to cause 10% of all CVD (WHO. 2011). In SA 37% of men and 7% of women smoke (HSFSA, 2019). Smoking causes vascular endothelial cell dysfunction initiated by a deficit of Nitric Oxide. Additionally, smokers exhibit elevated white blood cell counts, which stimulate oxidisation of lipids resulting in plaque development in the vascular system (Messner & Bernhard, 2013).

SA is a middle-income country with an increasing trend of urbanization and globalization. This is accompanied by behavioural changes, resulting in more individuals living an unhealthy lifestyle,

including consuming unhealthy food, smoking cigarettes, and inactivity (Mensah, 2013; Sampson *et al*, 2013; Mayosi 2015; Glezeva *et al*, 2018). These unhealthy lifestyle choices increase the risk for CVD.

1.2 Cardiovascular Disease Risk stratification

Risk stratification for CVD (high, moderate, or low risk) is determined according to the number of risk factors and symptoms individuals present with, as explained in Figure 1. For instance, a person with ≥2 risk factors for CVD are considered at moderate risk.

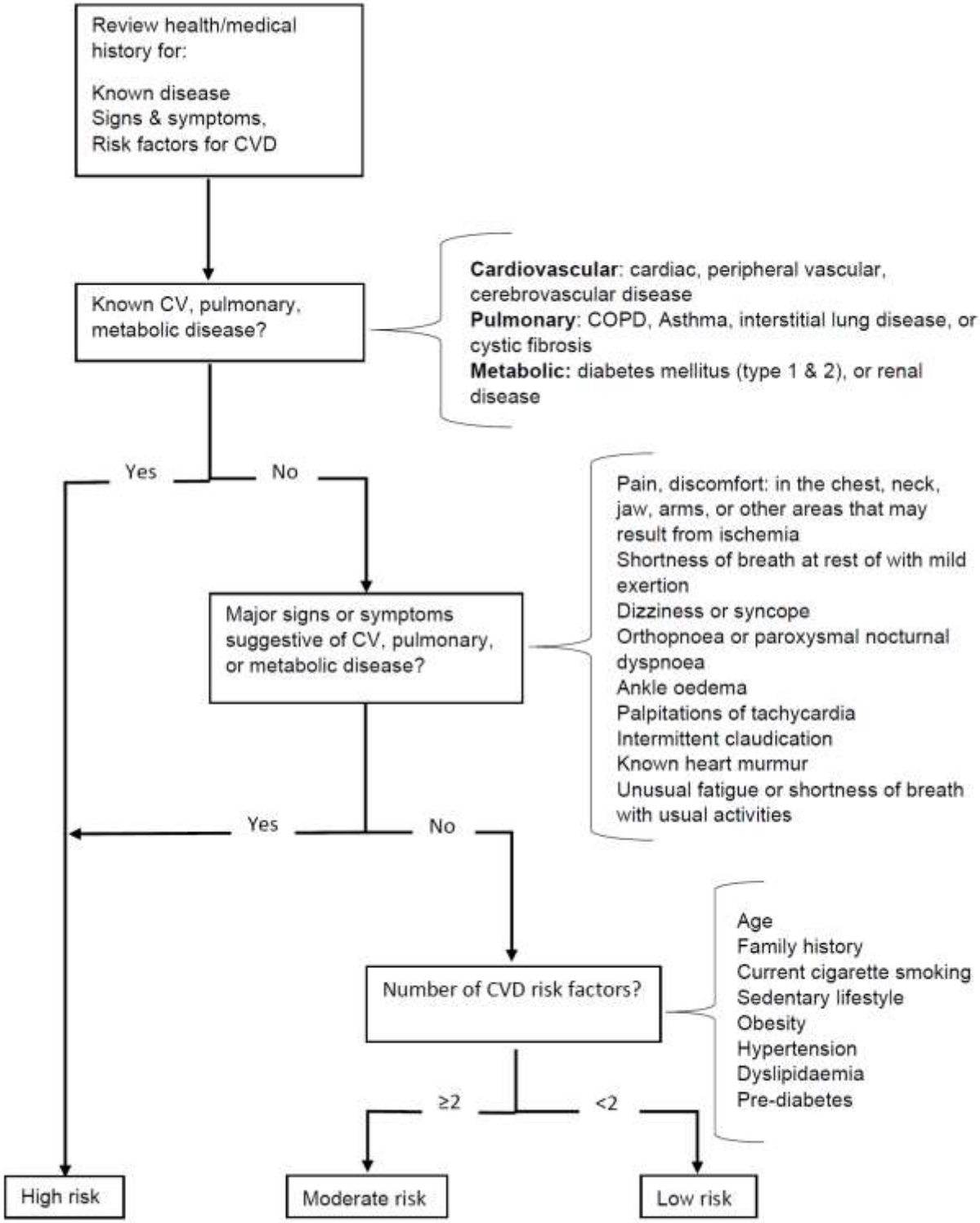

Figure 1: Logical model for classification of CVD risk (source: American College of Sports Medicine guideline 2018, p 26).

1.3 Strategies to control risk factors for Cardiovascular Disease

Allen and Dennison (2010) found that nursing interventions such as education plus behavioural counselling, and support conducted telephonically or via internet, for patients with Coronary Artery Disease (CAD) and Heart Failure led to improvements in blood pressure control, reduction in blood lipids, increased physical activity, improved nutritional intake, reduction/cessation of smoking, weight loss, improved health care utilization, and quality of life. Additionally, Lawlor *et al* (2018) found that community-based behavioural interventions focussed on education, participation in physical activity, and psychological support, utilizing telephonic or internet communication for patients with CVD showed improvements in physical activity, blood pressure, peak oxygen consumption, blood cholesterol levels and mental health. These studies were conducted with patients already diagnosed with CVD. Further investigation is required to establish the improvements, or consistency over a long-term period in individuals at risk for CVD.

1.4 Barriers to lifestyle modification in the presence of Cardiovascular Disease Risk

Implementing behavioural changes can be challenging. Sampson *et al* (2013) found that 94% of individuals struggled to change their attitudes and behaviours and adhere to a lifestyle aimed at reducing the risk of CVD.

The complexities of an individuals' daily life, and the difficulties of incorporating lifestyle modification interventions (LMI's) can be overwhelming (Bukman *et al*, 2014; Nöhammer *et al*, 2014). The two main barriers to lifestyle modification are time and cost (Bukman *et al*, 2014; Tawalbeh *et al* 2015; Kelly *et al* 2016; Nielsen *et al* 2017). Additionally, unplanned shopping routines, co-existence of other unhealthy behaviours, and poor motivation negatively impact nutritional choices (Sampson *et al*, 2013; Bukman *et al*, 2014; Kelly *et al*, 2016). Kleine *et al* (2019) provides further explanation, stating that preparation and planning to ensure there are healthy food options available are time consuming. It is also more difficult to make healthy choices in social settings surrounded by food and friends.

McGuire *et al* (2014) illustrated the three predominant reasons for not modifying lifestyle amongst a group of Australian women with Diabetes Mellitus (DM) were 'not interested', 'concerned about safety', and 'fatigue'. Bukman *et al* (2014) compared differences in perceptions to lifestyle

modification between persons with low and high socioeconomic status (SES). Both SES groups indicated that social influences, physical condition, time, energy, and habits were barriers to living a healthy lifestyle. In this Australian study, participants with low SES added cost as a barrier.

Kelly *et al*, (2016) and Bukman *et al*, (2016) established that people in higher SES groups are more physically active than people in lower SES groups. Additionally, Wardle and Steptoe (2003), Giskes and Turrell (2011), and Damiani *et al* (2011) established that people with low SES are less likely to modify their lifestyle or find ways to stay healthy and control their weight before experiencing adverse health conditions. However, Bukman *et al* (2014) established that low SES groups were more likely to adhere to LMI's if they receive lifestyle advice and participate in physical activities in groups of the same age, gender, and physical condition.

Studies conducted with women specifically, highlight social discomfort or self-consciousness, as a barrier to participation in physical activity (Berg and Wadhwa, 2002; Vaughn, 2009; Kelly *et al*, 2016). Additionally, having an existing physical ailment or chronic condition were also barriers to participating in physical activity.

Some research has indicated that more attention needs to be paid to individuals' perceptions of LMI (Heikkinen *et al*, 2010; Bukman *et al*, 2014). Individuals' perception of healthy eating is complex, and it reflects their personal, social, cultural, and environmental experiences (Bisogni *et al*, 2012). It is often broader than the scientific guidelines that health practitioners promote. Therefore, health care practitioners should individualise LMI's to accommodate these diversities.

A variety of health professionals can assist with lifestyle modification (biokineticists, nutritionists, sports coaches, and physiotherapists)**.** Establishing rapport with the health professional, the perceived experience, empathy from the professionals, consistency of consulting with the same professional over time, and follow up by professionals were identified as variables that enhanced lifestyle modification (Kleine *et al* 2019). Multidisciplinary teams consisting of physical trainers, nutritionists, and psychologists collaborating with individuals and the community to enhance education of patients can lead to improved adherence to LMIs (Sampson *et al*, 2013; Masana *et al*, 2017; Taylor *et al*, 2020).

1.5 Conclusion

I could not find any studies done in South Africa to explore the barriers to lifestyle modification that persons identified with risk factors for CVD experience. It has been indicated that rehabilitation programs developed in high-income countries cannot be transferred and implemented in Africa and SA without accommodation of contextual differences (WHO, 2011; Mayosi, 2014; Fiogbe *et al*, 2017; Masana *et al*, 2017). Before change can be implemented, there needs to be an understanding of persons` experiences. This is what has motivated my study, which aims to explore the barriers to lifestyle modifications experienced by persons identified at moderate risk for CVD. By understanding personal barriers to lifestyle modification, it might be possible to adjust programs, health systems, and initiatives to enable improved long-term commitment to lifestyle modification.

2. Methods

2.1. Design

A qualitative descriptive study was done. The qualitative descriptive design allows exploration of individual experiences when faced with limited time and resources. The purpose of the design is to learn from participants and use the knowledge to develop or enhance interventions. Some interpretation of findings occurs, but the design does not require the researcher to move away from a literal depiction of the data (Bradshaw *et al*, 2017). The reason for choosing this design is to learn first-hand from our surrounding population what barriers they experience during lifestyle modification, and how health care professionals can better support this population during this transition to allow for a more sustainable change in lifestyle.

2.2 Research setting

Data was collected from individuals living in the Blaauwberg suburb of Cape Town (Figure 2), Western Cape Province, South Africa. According to Stats SA (2015), most individuals living in this area are white (44.7%) or black South Africans (44.4%), the remaining 10.9% is comprised of other ethnicities. The majority (72.7%) were of working age (15-64 years) and completed secondary or tertiary education (66%). Average income in the area ranged between R9601 – R1

228 800 per annum. Half (49.9%) of the population had internet access. The main language spoken in this area was English, followed by IsiXhosa (Stats SA 2015). The reason for choosing this population of individuals was linked to the aims and outcomes of this research assignment. We wanted to establish the barriers and difficulties people face with changing their lifestyle before they are diagnosed with any type of heart disease, as the motivation for this research assignment was to help prevent/prolong the onset of heart disease.

Figure 2: Map outlining suburban areas of Cape Town (www.Ontheworldmap.Com, 2012)

2.3 Population, sampling, and recruitment

The study population included any individual at moderate risk for CVD (2 or more risk factors for CVD without any signs or symptoms of heart disease) that used private medical facilities and were living in the Blaauwberg suburb of Cape Town between June 2020 and January 2021. Individuals who were diagnosed by a qualified health care professional with any two risk factors (high blood pressure, insulin resistance, high cholesterol, obesity, inactive, smoking) for CVD. Individuals were excluded if they had already been diagnosed with one or more signs or symptoms (Figure 1) of heart disease or had already been diagnosed and receiving treatment for any type of CVD, pulmonary disease, or metabolic disease. Additionally, participants were excluded if they presented with less than two risk factors for CVD.

Since the study population was unknown volunteer sampling was used (O'Leary, 2017). After obtaining ethics approval for this study from the Stellenbosch University Health Research Ethics Committee (Reference S19/10/265), advertisements (Appendix A) for volunteers were placed at private health care facilities and on social media pages as outlined in Appendix B. Individuals who were interested in participating in the study contacted me telephonically. During this initial contact I determined that the participant met the inclusion criteria of the study before proceeding. I then explained the study and answered questions about the study in the language preferred by the participant, after which I requested verbal consent. A date and time, convenient for the participant, was established for the telephonic interview. The information sheet and informed consent form was emailed to the participants who signed and returned it to me by email (Appendix C). Interviews were conducted with 11 which was sufficient to provide data saturation.

2.4 Data collection strategy and instrument

After a pilot study data was collected through one-on-one, semi-structured telephonic interviews, which I conducted. Interviews were guided by an interview schedule (Appendix D). After demographic information was collected the interview proceeded, with a broad question related to the study topic, "What is your understanding of cardiovascular disease?" I allowed the conversation to flow from there. I used additional probes where necessary, such as, *"Can you give me an example of … from your personal experiences"* or *"Can you provide more details of …"* I

also used summarization and clarification techniques to confirm that I have understood the information correctly, or to give the participant the opportunity to further elaborate on a question. Examples include “So, in summary what we have discussed so far is…” and “What do you mean when you said…?” (Reid & Marsh, 2014).

The phone was on loudspeaker and interviews were audio recorded (consent was established in the informed consent document, Appendix C). Interviews lasted ±20 to 45 minutes. All participants chose to be interviewed in English. Telephonic interviews allowed participants to maintain confidentiality and anonymity and helped mediate power dynamics between me and them (Drabble *et al*, 2016). Additionally, it enhanced the participants` and my health and safety in the time of the COVID 19 pandemic**.** During the time of this research, COVID 19 was established by the government of South Africa as a national disaster, which caused a nation-wide lock-down. Movement outside the home was only permitted for essential work or shopping purposes.

2.5 Data analysis

Interviews were transcribed by me as they were performed. After transcription initial analysis was done to determine when data saturation (where no new information emerged from participants) was reached (Bradshaw *et al*, 2017). Initial analysis gave way to more comprehensive thematic analysis (Braun & Clarke, 2008, p84). I read through transcripts multiple times. I started to code data based on the study objectives and created excel spreadsheets to summarise codes (appendix E and F). Themes, sub-themes, and divergences were identified from that. Once themes and divergences were established, depth was added to each category through narrative examples.

2.6 Trustworthiness

Seeking credibility, transferability, dependability, and conformability assisted me to deliver work that is trustworthy (Golafshani 2003; Mabuza *et al* 2014; Noble & Smith 2015). Credibility was enhanced by data saturation and presenting opposing viewpoints. Supervisors that have experience in qualitative research gave valuable feedback throughout the study. Transferability can be deduced from the description of the setting, methods, and participants. A presentation of limitations and description of study processes should enhance dependability. Conformability was

enhanced through reflexion on my interactions, biases, preferences and preconceptions during data collection and analysis.

2.7 Ethical considerations

Ethics approval was acquired from Stellenbosch University Health Research Ethics Committee (HERC), reference S19/10/265 (Appendix G). Participation was voluntary and written informed consent was obtained from participants in the language of their choice. There was a possibility that participation in the study could elicit negative emotions. If counselling was required participants could be referred accordingly. However, no participant required counselling. Nobody was excluded based on gender or ethnic grouping. Participants were compensated for their time and inconvenience. Participants had the right to withdraw from the study at any stage, or to refuse to answer any question with no consequence to their person. All information gathered from participants was kept confidential and safely protected in encrypted files on my laptop that was also password protected and locked in a safe when not in use (DoH, 2015). Results of the study will be made available to all participants on completion of the study.

3. Findings

3.1 Demographic details

Participants' ages varied between 25 and 56. The most common risk factors were smoking (6), inactivity (5), and obesity (5) (Table 1).

Table 1: Overview of Participant's Demographics

Research Participant (RP) number	Gender	Age	Risk factors
RP 1	Female	55	High cholesterol Smoking
RP 2	Female	38	High blood pressure Obese

RP 3	Female	39	Inactive Smoking
RP 4	Male	25	Inactive Obese
RP 5	Female	26	High blood pressure Obesity
RP 6	Female	38	Smoking Inactive
RP 7	Male	56	Diabetic Smoking
RP 8	Female	49	Smoking Obese
RP 9	Female	55	High blood pressure Diabetes
RP 10	Female	49	Smoking Inactive
RP 11	Male	48	Obese Inactive

3.2 Themes

Three themes were identified. Under the two themes related to barriers and facilitators to lifestyle modification (themes two and three) subthemes were similar and informed by the three activities (physical activity, eating habits, and smoking) that individuals can perform to modify their lifestyles to decrease risk for CVD (Table 2). Similarly, the same subheadings were used to order findings under each subtheme.

Table 2: An illustration of themes, subthemes and subheadings used in presentation of findings

	Theme	Sub-themes	Subheadings
Theme 1	CVD "You can prevent it"	CVD "It is serious, you can die".	
		Risk for CVD, "It's all about lifestyle."	

		Sentiments "It's quite a shock, that it's heart disease"	
Theme 2	Lifestyle modification "It just feels like an insurmountable task."	Physical activity "That's a swear word."	• Health & quality of life • Socio cultural factors • Physical environment • Access to facilities and resources • Personal and Psychological factors
		Eating habits "It is an effort and I just don't feel like 'efforting' at the moment."	
		Smoking "It's like a buddy"	
Theme 3	A better lifestyle "It's all about self-awareness, self-love"	Physical activity, "I like the fresh air"	
		Eating habits, "If you're not in a routine, you're never going to get it right"	
		Smoking, "I just dead-stopped"	

3.2.1 Theme 1: Cardiovascular disease, "You can prevent it."

Participants understanding of cardiovascular disease varied. Some realized that it could result in stroke, heart attack and/or death.

> *"Well, that it is serious, and that you can die."* (RP 9)

Others seemed to have no understanding of CVD.

> *"Generally uninformed."* (RP 5)

A few participants gave more details regarding the pathology of CVD development.

> *"high blood pressure, cholesterol is a closing of the arteries, or a hardening… The blood flow is not going through as well. So you get more tired, you are not as 100% as you were when you're 20."* (RP 1)

Participants knew some of the risk factors for CVD, however this knowledge could be associated to the advertisement that invited volunteers to participate in the study. Specific risk factors mentioned by participants included an unhealthy lifestyle, high blood pressure, high cholesterol, obesity, poor diet, and lack of exercise.

Participants had mixed feelings about their risk for CVD. Some were indifferent, “if I die, I die.” (RP 11). A few were worried, but avoided the subject, “it is a scary thought, but I try not to think about it.” (RP 6). Others were happy they knew their risk so they could be in control, “…it makes me feel like I’m at least in control of the future… so if I continue these things, I can maybe prevent it.” (RP 3). Feeling hopeless, scared, and frustrated was described by some participants, “Well, it makes me feel horrible… I feel absolutely hopeless.” (RP 5). A few participants were unaware of their risk for CVD until they saw the advertisement for this study. They were shocked to learn of their risk, " It’s quite a shock now that it’s heart disease. I know that there’s other problems, but I didn’t think of heart disease.” (RP 10)

3.2.2 Theme 2: Lifestyle Modification “It just feels like an insurmountable task.” **(RP 9)**

3.2.2.1Physical Activity “That’s a swear word.” (RP 9)

3.2.2.1.a. Health and quality of life: Mental health challenges caused barriers to exercise. Some participants have been diagnosed with health conditions such as depression.

> *“I'm tired, but I can't fall asleep kind of thing…subsequently I’ve been diagnosed with severe depression.”* (RP 8)

Others were not formally diagnosed, but their narratives spoke of anxiety and depression.

> *“I have anxiety, I come from a very poor background… I was homeless at the age 13. I've always worked hard…and wanted to be better, which causes a lot of anxiety. But now being overweight and being unhealthy causes more anxiety.” (RP 5)*
> *“I just find that I'm very tired most of the time, no matter how much, or how little sleep I get… And to motivate myself to go and have that 30-minute walk, or whatever… it feels like an insurmountable task.”* (RP 9)

3.2.2.1.b. Sociocultural factors: Social and cultural factors that created barriers to physical activity included job requirements, a lack of support, feeling unsafe when exercising outside, and social activities. Economic realities, and the requirements of individual jobs interacted in a negative manner and left little time for exercising.

> *"I sit here at about 6 o'clock in the morning, and I get stuck in [working]. The more I do, the more I get paid. If I'm not working, I'm not getting paid."* (RP 1)

Additionally, participants indicated that not having an active partner discouraged them from exercising. The reality of unsafe environments also played a role.

> *"Mainly exercise is walking… I don't go out so much anymore because of, obviously it's not that safe…there's been a lot of muggings."* (RP 1)

Social interactions with family or friends hindered physical activity.

> *"On weekends I've usually got plans, to meet up with friends…. So no, I'm not really active."* (RP 10)

3.2.2.1.c. Physical environment: Adverse weather conditions hampered exercising.

> *"This heat would put me off, and the wind puts me off."* (RP 8)

3.2.2.1.d. Access to facilities and resources: Participants felt they needed help to start exercising but this was hindered by financial constraints and limited organised physical activities.

> *"I think the ideal thing would be to actually have a trainer, a health coach. But that is a bit difficult at the moment because of finances."* (RP 5)
> *"if the times were flexible, and it was affordable, then that would make choosing that [organised physical activity classes] much easier."* (RP 3)

Shortage of time was commonly cited as a barrier to exercise.

> *"I leave at six o'clock in the morning on a bus. I get at work at 07:30. And I get home at 17:30. Then I need to cook, I need three hours of studies, I need to clean my house…"* (RP 3)
> *"I'd be reluctant to sign up [for gymnasium membership] for something that's, say, like R500.00 a month, and then be able to go once a week. That's just ridiculous."* (RP 3)

3.2.2.1.e. Psychological factors: Psychological factors varied from a lack of interest and motivation to being self-conscious.

> *"Gym is not an option for me right now, I'm too ashamed of my body…So, finding a gym outfit, or an outfit that I can go walk around our block, is … mentally horrible for me. It's really hard for me to get dressed."* (RP 5)
> *"I kind of feel self-conscious going into the gym, I feel self-conscious in the classes… there's a lot of yoga poses that I can't do, because I am hamstrung by this belly that I have."* (RP8)

Self-conciseness went beyond appearances to being uncomfortable and intimidated in a gymnasium.

> *"So, I'm really clueless as to what the machines are for. What to do, how to use them… I would go to a gym, get on a treadmill, walk for half an hour. But the rest of the machinery, and the weights, and what I should be doing is not there. The knowledge is not there."* (RP 6)

3.2.2.2. Eating habits "it is an effort and I just don't feel like 'efforting' at the moment."

3.2.2.2.a. Health and Quality of life: In some instances, participants' medication for co-existing conditions caused weight gain.

> *"I took medication for depression, and the medication for depression makes you fat."* (RP 8)

Untreated medical conditions also influenced eating habits.

> *"That's the main snack time [during the night]. Because I can't sleep, I've got insomnia."* (RP 10)

3.2.2.2.b. Sociocultural factors: Cultural habits, and social life played a negative role in maintaining a healthy diet.

Different ethnicities influenced the types of food individuals would typically eat.

> *"With me being Indian, as a race group, I would say some of my cultural food could be a factor. Such as, a typical curry has a lot of oil… fatty meat."* (RP 4)

As with cultural food choices eating habits from childhood were also ingrained and hard to change.

> *"Growing up it was meat, potatoes, pastas, lasagnes, fish and chips, burgers, everything that you can think of that is unhealthy. So, McDonald's every weekend…a lot of meat, a lot of sodas. A lot of sweets. We didn't have a stack of sweets… But when there was sweets, we ate everything at once. There was never salads, or vegetables. If there was a vegetable it was with sauce, and cheese… and now at the age of 26, being married, it's still a struggle to change that."* (RP 5)

Social interactions and friends also played a role in participants food choices.

> *"It sounds bad, but friends and socialising were actually being a barrier… people don't generally look at having a meal of a salad together, compared to a burger, or a steak."* (RP 4)

Inconsistent mealtimes led to poor food choices.

> *"Timing's a big issue… if I say that it's too late to eat at 10, 11 o'clock at night, and then I'll think, "Well, I'll eat tomorrow morning." I wake up at two, three o'clock in the morning, and I'm absolutely ravenous, and I'm digging in the fridge looking for something to eat."* (RP 8)

3.2.2.2.c. Physical Environment: Nothing related to this was shared by participants

3.2.2.2.d. Access to facilities and resources: Participants talked about contradictive information on the internet and from service providers.

> *"you can only take what is off the internet. And there's so many contradictions, one says this, one says that. So, you try and go with what, what you think is the right thing…I haven't found anybody that gives you a proper guideline. Like, this is healthy, and this is not. Everybody's got their own opinions, and they take their own opinions into their practice which makes it also difficult. Because you can go to one that says, "Meat is fine", and the other one can say: "Oh no, red meat is poison."* (RP 6)

They also indicated that health care services and health insurance were not affordable or supportive of their needs.

> *"I think in general that obesity is not seen as a disease by medical aid. I had approached my doctor about this, and he couldn't provide me with anything that can actually help me. So, (sigh), like even the breast reduction which will allow me to be more healthy is not covered by medical aid. So, I do think that's one of the restrictions also on living healthier."* (RP 5)

Participants felt that healthy food was expensive.

> *"I've noticed that if you want to eat beautiful, healthy food, you need to have lots of money."* (RP 8)

They further expanded and indicated that most eating plans and diets were not sustainable due to financial costs, and the menu becoming mundane.

> *"I tried dieting before, Banting and stuff. And it's fine for a week or so. But after two weeks it gets boring or... too expensive to bant all the time and... you get bored and I miss my chips and things like that."* (RP 11)

Finally, they felt that the food presentation and availability at local shops was not conducive to maintaining a healthy diet.

> *"I found myself going from shop, from pillar to post, battling to find what I was looking for i.e. organic, fruit and veg, or organic meat."* (RP 6)

> *"There's not exciting vegetables. Or they're not nicely presented. I know it sounds terrible to say that, but if you go to [upmarket shop] the veggies look … exciting… And you want to buy them because you feel creative. Whereas the [local shop] where I stay, it's very limited, and everything looks a little bit like it's one day too old."* (RP 8)

Participants indicated that it took less time and planning was an issue, and it was more convenient to eat what they had in the house.

> "… maybe I just didn't defrost something in the morning. I didn't buy the right stuff. I just make whatever's available at home… Because I'm in a hurry." (RP 10)

3.2.2.2.e. Psychological factors: Participants indicated that a lack of motivation, a lack of knowledge, cravings, co-dependency, and disinterest lead to them not modifying their eating habits. They felt the effort involved in changing eating habits was one of the reasons for eating unhealthy food.

> *"it's all fine and well saying you need to change your lifestyle, but it is an effort… And, (laughs), I just don't feel like 'efforting' at the moment"* (RP 9)

> *"It's not that I'm uneducated, and it's not that I don't know better… I know exactly what needs to be done… the reality is just so far removed."* (RP 8)

> *"snacking on chips while you're watching TV... All the bad things is all there, I'm not likely to change it"* (RP 11)

In contrast other participants felt they lacked knowledge of what constituted a healthy diet.

> *"I would say the biggest thing is diet. Not knowing what to…what diet to actually eat healthy."* (RP 6)

Food cravings stimulated by stress, boredom, self-control and/or menstruation were a struggle.

> *"Sometimes when I'm too stressed out at work I'll go and eat something, Comfort food."* (RP 11)

"I don't consume much in the way of sugar. Um, unless I have PMS, in which case sometimes there's a craving for, a chocolate or whatever." (RP 3)

Co-dependency was a battle for a few participants.

"I used to … only go on a diet, or something when he [husband] did" (RP 5)

3.2.2.3 Smoking "it's like a buddy" (RP 7)

3.2.2.3.a. Health and Quality of life: The additive nature of nicotine made quitting difficult.

"There's definitely an addictive thing to the nicotine, that you actually do crave … you can feel it, that you haven't had the nicotine." (RP 8)

The side effects of medication that are designed to help people stop smoking further hindered the process for some.

"I tried the Champix tablets for quite a while, but they made me incredibly ill." (RP 1)

3.2.2.3.b Sociocultural factors: Some participants smoked more when they socialize, especially where alcohol was involved, "If you have a drink and then you really need that smoke." (RP 7)

Being around other people who smoked made it difficult to stop smoking or not to start smoking.

"You get reminded everyday about it, because everyone around you smokes." (RP 7)

"Sitting with all the friends. Everybody's smoking, we're drinking, and I just said, "Can I have one of those?" [cigarette]… And it, and it was hideous. It tasted hideous, I felt ill, and I persevered to get back into smoking." (RP 8)

3.2.2.3.c. Physical environment: No Information shared.

3.2.2.3.d. Access to facilities and recourses: None were found.

3.2.2.3.e. Psychological factors: The comfort, familiarity, and stress relief experienced through smoking, coupled by the addictive nature of nicotine made it difficult to stop smoking. Participants that had been smoking for a long time felt that smoking was like a friend to them.

> *"It's like you are free, you know. You'd be lost without it, (laughs). So, you know, it's like a buddy."* (RP 7)

Quitting smoking seemed impossible to some participants.

> *"Look, the smoking I am not going to win on, I have tried many times…I enjoy my cigarettes. I'm not going to give up everything and stress myself out to stop smoking."* (RP 1)

3.2.3. Theme 3: A better lifestyle "It's all about self-awareness, self-love" (RP 5)

3.2.3.1 Physical Activity "I like the fresh air" (RP 7)

3.2.3.1.a. Health and Quality of life: Improved health and better quality of life served as motivation to be physically active.

> *"I'm 26, before I'm 30 I want children. And, well I can't play with them [children] on the sand, I can't because I won't be able to get up…I know that when I wasn't fat, I wasn't tired…If I lose just five kilograms, I know I will be able to be more comfortable."* (RP 5)

3.2.3.1.b. Sociocultural factors: Participants felt that support from a group or partner could motivate them to participate in physical activity more frequently and keep them accountable.

> *"A group of other people who have the same struggles as me… Who won't judge me, would be ideal."* (RP 5)

> *"I think having friends' gym along with me, helps with a form of accountability."* (RP 4)

Others felt that having a dog that requires regular exercise could motivate them to be physically active.

> *"I have a dog. He's used to being exercised quite regularly, but our garden isn't big enough. So, he would need to be walked at least every second day to get the same kind of exercise. I'm actually hoping that … him needing to be exercised forces me to make sure that he does."* (RP 3)

3.2.3.1.c. Physical environment: Being outdoors was enjoyable to a few participants.

> *"I like the fresh air."* (RP 7)

3.2.3.1.d. Access to facilities and recourses: Participants indicated that cheaper gymnasium membership or free outdoor facilities where they were not bound by finances or time, would encourage them to be more physically active.

> *"We have these little outdoor gyms popping up at the local park. I'm not then tied down to a particular time of day that I can do this kind of thing [physical activity]."* (RP 3)

> *"[If] actual gym memberships were a lot cheaper…that would definitely motivate me to exercise."* (RP 7)

Having access to professional help would also increase participants physical activity.

> *"I have tried what is called HITT Fitness. I found that to work for me very well. Reason being is that they…it's personal training. It's one on one training. They tell you what to do, they immediately tell you if you're doing something wrong"* (RP 6)

Targeting health campaigns at youth was suggested as a means of developing healthier habits at a younger age.

> *"the younger you can introduce someone to live a cheap, healthy lifestyle the better it will be."* (RP 4)

3.2.3.1.e. Psychological factors: Participants mentioned that physical activity helped them cope with stressful situations.

> *"My dad is living with us, and he was bed-ridden… you feel like the walls are coming in on you, because you've got the pressure to look after him, and check that everything's okay…And it was just a case of, let's just get some fresh air, and let's just get out of here for 5 minutes, clear the mind."* (RP 1)

Participants felt that physical activities that are enjoyable would be more appealing.

> *"I'd much rather do something … like dance, some or other kind of enjoyable … fitness programme."* (RP 3)

3.2.3.2. Eating habits "If you're not in routine, you're never going to get it right" (RP 7)

3.2.3.2.a Health and Quality of life: Family responsibility motivated participants to make healthier food choices.

> *"Should something happen to me in the long-run, I don't want my family, or my children one day to say that I didn't look after myself."* (RP 5)

Others wanted to improve their quality of life for themselves.

> *"I'd come so far, because I'd lost, like, 10 kilos, and I was feeling really healthy, and I was sleeping better."* (RP 3)

3.2.3.2.b. Sociocultural factors: Support from family members assisted participants in making healthier food choices.

> *"My daughter and I decided to go on a diet together… the fact that we were both doing it and motivating each other was great."* (RP 9)

3.2.3.2.c. Physical environment: Seeing the amount of fat participants prevented themselves ingesting, motivated them to cook healthier options.

> *"Just looking at the amount of fat that I would have put into my body. And the amount of grease I would have put into my body…that motivates me, looking at that afterwards."* (RP 4)

3.2.3.2.d. Access to facilities and recourses: Under "barriers" (3.2.2.2d) the ambiguity of online information was mentioned. In contrast, some participants found online information helpful.

> ***"****There's a lady on YouTube, her page is called, "Pick Up Limes". And she's a nutritionist that is vegan, and she doesn't try to recreate meat. She makes vegan meals with lentils, and plants, and that has been very inspiring."* (RP 5)

Additionally, in contrast with earlier opinions, some participants mentioned professional assistance helped them choose healthier food options and kept them accountable.

> *"I did consult a nutritionist, last year… and I kept a food journal, which I used to just email her once a week. Which did tend to keep me more on track."* (RP 8)

As did online shopping, because it assisted participants to buy only what they needed and not be enticed by unhealthy options available in store.

> *"I used to buy everything online, and get it delivered to the house so there was no going into the shops, and …doing that, seeing what's available shopping. But actually buying what I needed."* (RP 8)

3.2.3.2.e. Psychological factors: Some participants showed mental forte with changing their eating plan to a healthier alternative.

> *"It's a revelation that I had about meat and cheese… the vegan lifestyle is not a promise… but to me it's something that I'm holding onto."* (RP 5)

Other participants were used to eating healthy due to entrenched behaviours and emphasized the importance of developing a routine.

> *"If you're not in routine, you're never going to get it right…I've been doing this [eating healthy] so long. I don't change it…we've learnt the hard way."* (RP 7)

Finally, seeing results acted as motivation to maintain healthy eating habits.

> *"I think the minute you start seeing results you do feel a bit more motivated to continue."*

3.2.3.3. Smoking "I just dead-stopped."

3.2.3.3.a. Health and Quality of life: None were found.

3.2.3.3.b. Sociocultural factors: Participants thought that smoking reduced work productivity.

> *"I find it very unproductive. This getting up, going outside to smoke, coming back inside. Because it's actually not ten minutes, it's actually half an hour… So if you count up that a person has a cigarette …You're losing like four hours a day."* (RP 8)

Having support or an external stimulus sometimes encouraged participants to quit smoking.

> *"The first time I was married, and my husband stopped smoking, so I said, "Okay, I'm also stopping smoking"…The second time I wanted a TV, and I couldn't afford cigarettes, and the TV. So, I decided on the TV. Once the TV was paid up, I started smoking again."* (RP 8)

3.2.3.3.c. Physical environment: Smoking restrictions helped participants reduce smoking.

> *"Can't smoke at work anymore. So that definitely put a damper on that."*
> (RP 8)

3.2.3.3.d. Access to facilities and recourses: The availability of medical interventions such as nicotine patches helped participants to reduce or quit smoking.

> *"Because the nicotine you can manage with patches."* (RP 6)

3.2.3.3.e. Psychological factors: A participant said she stopped smoking through self-discipline. However, this was not permanent.

> *"I stopped smoking once for four years. I just dead-stopped, for four years."* (RP 8)

4. Discussion

4.1 Understanding cardiovascular disease and its risk factors.

This study found that participants had a vague understanding of CVD. They did not seem to understand the intricate details of the pathology. However, they understood that if they do not maintain a healthy lifestyle, it can lead to disease or death. They also understood that CVD is preventable through managing their modifiable risk factors. This understanding is important, as it can encourage people to modify and maintain a healthy lifestyle (Webster & Heeley, 2010; O'Flaherty, 2013)

4.2. Health and quality of life

There are many benefits to maintaining a healthy lifestyle such as being free of disease and its disabilities, better quality of life, and reduced financial burden. Being fit and having normal body weight improves a person`s general health and mobility (Tolnai *et al*, 2016). Therefore, it is easier for people to participate fully in their life roles, such as playing with their children, socializing, and working. Additionally, healthy lifestyle also improves self-esteem, leading to people being happier (Tolnai *et al*, 2016). Current participants realized this but sometimes lacked the motivation and energy to modify their lifestyles.

Among current participants mental health challenges more than physical ailments were both a cause and consequence of unhealthy lifestyles. It seems that the lethargy associated with depression hampered exercising and the effort required for planning and preparation of food. This is unfortunate as research on depression shows that healthy eating and physical activity combats depression (Sarris *et al*, 2014), and other conditions mentioned by participants such as insomnia and anxiety.

Participants recognized that stress, sleeping patterns, and consumption of alcohol negatively impact their health, increasing their risk for CVD. Moderate consumption of alcohol is associated with reduced mortality primarily because it reduces coronary heart disease. However, heavy alcohol consumption can increase mortality through hemorrhagic stroke and other non-CVD's (Nanchahal *et al*, 2000). Heavy alcohol consumption, obesity, and diabetes affects sleep

patterns (Vitiello, 2006; Vgontzas, 2008; Barone and Menna-Barreto, 2011). Insufficient sleep (<6 hours per night), and especially poor quality of sleep has been linked to CVD (Hoevenaar-Blom *et al*, 2011). Additionally, stress has been connected to mental disorders such as depression and anxiety. Heart rate and blood pressure in turn show an immediate adverse physiological response to anxiety (Cohen *et al*, 2007).

4.3. Sociocultural factors

Support from family, friends, or professional assistance was revealed as a facilitator to lifestyle modification in this study. Individuals with support find it easier to make healthier choices, whereas those without support struggle (Limbit, 2009; Molloy *et al*, 2010). Having support helps individuals quit smoking (Johnson *et al*, 2009). Individuals with support made time for exercise, healthier food choices, and were held accountable. Warner *et al* (2021) found that social support and self-efficiency were synergistic. People with low self-efficiency were less likely to participate in physical activity despite having social support, and people with little support were also less likely to be physically active despite having high self-efficiency.

Socializing with friends plays an important role in our quality of life (Ateca-Amestoy, 2013). However, it can have a negative impact on lifestyle choices. Participants repeatedly mentioned that when they were with friends they would smoke more, eat unhealthy food, and neglect exercise. This is consistent with findings by Kelly *et al* (2016).

Family meal cultures can impact eating habits (De Wit *et al*, 2014). Additionally, eating habits are influenced by ethnic differences (Devine *et al*, 1999). This study further confirms these findings. Participants experienced struggles with overcoming unhealthy food choices related to their upbringing and ethnical background.

Safety concerns could prevent participation in outdoor physical activities (Oyeyemi *et al*, 2012). Inacio *et al* (2015) findings contradict this, however, their review mainly included evidence derived from high-income countries, whereas Oyeyemi *et al* (2012) conducted their study in Nigeria, a middle-income country like SA (World Bank, 2021). In addition, the Cape Town metropolitan area is known for public violence such as muggings (Spinks, 2001). Thus, safety concerns when exercising outdoors are realistic.

4.4. Physical environment

The physical environment hinders or enhances physical activity (Kelly *et al*, 2016). Weather and the cost of gymnasiums were highlighted as barriers in this study. Participants could not always partake in outdoor activities due to weather and safety concerns, and they could not afford gymnasium membership. Outdoor gymnasium equipment is becoming more popular and is a free alternative to indoor membership orientated gymnasiums, however this will still be subject to weather and safety circumstances. Participants referred to free equipment and organized physical activity groups in parks. However, they have made no attempt to join these activities. Reluctance to participate in these free activities stemmed in part from fear of social judgement. We live in a world where individuals pass judgement on their own body's physical appearance and competencies, as well as that of others. This can negatively impact people's desire to participate in physical activity, especially in public (Lindwall, 2004). This is unfortunate because exercise is known to improve self-esteem, which in turn reduces self-consciousness (Biddle *et al*, 2003).

4.5. Access to facilities and resources

Lack of time was a common reason for not participating in exercise and not preparing healthy food. Furthermore, low energy levels, decreased motivation, and a lack of planning underlined the barrier of time. This is a paradox because physical activity helps improves energy levels and motivation (Biddle *et al*, 2003). One way of addressing time constraints and poor planning is incorporating physical activity and healthy food preparation into the daily routine. It should become a given, not something for which extra time needs to be allocated.

An often-mentioned resource to aid lifestyle modification was money. The financial burden of CVD was not an element uncovered in this study. Possibly because this study explored barriers to preventing risk factors of CVD, as opposed to CVD itself. However, finances were repeatedly mentioned as a restriction on participants' ability to pursue and maintain a healthy lifestyle. Participants did not acknowledge that it is more economical to focus resources on preventative care rather than on curative, pharmaceutical and rehabilitative care (Mendis & Chestnov 2013; Khanji *et al* 2018). In addition, CVD can negatively impact a person's ability to work and generate an income, creating greater financial challenges. Thus, the very thing that participants

felt decreased the time they had for exercise and preparing healthy meals (i.e. their work) might be jeopardized by not preventing the risk factors of CVD.

Shopping habits, availability of shops, and food presentation in shops were identified in this study as barriers to buying healthy food. Previous literature has illustrated that the convenience of shops increased the probability of eating healthier (Cannuscio, 2014). The differences in opinion could be abetted by the convenient shops in the study area not having a wide variety of well-presented healthy food options.

4.6. Psychological factors

A barrier specific to eating healthy was struggling with cravings for unhealthy foods. Food cravings have been explored extensively, it is something that all humans experience, however, the types and intensities of cravings varies (Richard *et al*, 2017). Current participants indicated that they mostly craved unhealthy foods, and this was amplified when watching television. This is consistent with findings by Grothe *et al*, (2012). There are interventions to assist with food cravings such as imagery and body scanning (Hamilton *et al*, 2013), but none of the current participants were aware of these techniques.

Smoking is a tough habit to break (Copeland, 2003). It has physiological and behavioral addictive elements (Benowitz, 2010). Participants in this study talked about smoking being a justifiable break from work, more so than exercise. When quitting smoking, or thinking of quitting, participants described mood changes that were consistent with depression and anxiety. Depression is a common withdrawal symptom of smoking (Foulds & Ghodse, 1995). However, Zvolensky *et al* (2007) found that anxiety is associated with smoking. What is unclear from research is whether anxiety is purely related to smoking, or whether individuals suffer with anxiety disorder that has gone untreated and use smoking as a form of self-medication, thus making it harder to quit. Additionally, instant gratification and lack of self-control are traits associated with an addictive personality, this can also amplify unhealthy behaviours such as smoking, (Amodeo, 2015).

Some participants in this study stopped smoking for extended periods of time before starting the habit again. Interestingly, none of the participants quit to improve their health, even though they

were aware of the risks pertaining to smoking. It seems as if the immediate gratification and the reward of a television were more of a motivator to stop smoking than preventing the risk of a disease that they have never experienced personally (Curry *et al*, 1997). One participant even persisted through hating the taste and smell of smoking just to get back into the habit. A positive sidenote from this study is that "smoke free" policies were effective in helping people reduce smoking.

Having knowledge empowered individuals to make healthier lifestyle choices such as experimenting with food options. Whereas those that lacked the knowledge were fearful or avoided making healthier choices, especially with regard to physical activity. "Knowledge itself is power," (Sir Francis Bacon, 1597).

5. Limitations

The study was limited to a small area of Cape Metropole and comprise of a small sample. This was abetted by financial constraints. Recruiting volunteers to participate in the study was a limitation as people who volunteer might differ from those who do not volunteer. They might have a specific interest in the topic and might have thought more about issues related to the topic introducing bias through that. Additionally not collecting data on socioeconomic status and cultural background was a limitation. The use of telephonic interviews posed various limitations such as lack of non-verbal cues, therefore I had to be more tuned to verbal cues. Additionally, I lacked the opportunity to create a comfortable ambiance and rapport with the participants **(**Opdenakker, 2006; Drabble *et al*, 2016**)**. No data was lost due to poor connections or other telecommunication challenges. Volunteer sampling

6. Conclusion

Various barriers and facilitators to lifestyle modification identified in this study concurred with previous findings. The most common of these were time, financial constraints, lack of support, and diminished desire. However, it has highlighted elements specific to the setting such as safety concerns, not having convenience stores stock healthy foods that is well presented and appealing

to look at, a need for exercise equipment in public spaces that is free to the public and targeting health campaigns at younger individuals so they can incorporate healthy habits earlier.

7. Recommendations

- Convenience stores should stock healthy foods that is well presented and appealing on the eye.
- Local government could place exercise equipment that is free to the public in public spaces.
- Campaigns focused on lifestyle modification should target younger individuals so they can incorporate healthy habits earlier in life.
- Developing of a buddy system for persons who want to start with lifestyle modification can be explored.

Further investigation should focus on the financial burden of CVD compared the financial cost of a healthy lifestyle. Additional investigation on cravings for unhealthy foods would be beneficial to changing unhealthy behaviors. Finally, studies with individuals who were at risk for CVD, but managed to control their risk factors due to lifestyle modifications will assist in identifying strategies for success.

8. References

Allen. J., Dennison. C., (2010). Randomized trials of nursing interventions for secondary prevention in patients with coronary artery disease and heart failure. *Journal of Cardiovascular Nursing*, Vol 25:3, pp 207–220.

American College of Sports Medicine., (2013). ACSM's guidelines for exercise testing and prescription. 9th ed. *Londres: Lippincott Williams and Wilkins*, pp 26.

Amodeo. M., (2015). The Addictive Personality, *Substance Use & Misuse*, Vol 50:8-9, pp 1031-1036.

Ateca-Amestoy. V., Aguilar, A.C. & Moro-Egido. A.I., (2014). Social Interactions and Life Satisfaction: Evidence from Latin America. *Journal of Happiness Studies*, Vol 15, pp 527–554.

Barone. M. T. U., and Menna-Barreto. L., (2011). Diabetes and sleep: A complex cause-and-effect relationship, Diabetes Research and Clinical *Practice*, Vol 91:2, pp 129-137.

Bashir. M., Afzal. M.T. and Azeem. M., (2008). Reliability and validity of qualitative and operational research paradigm. *Pakistan journal of statistics and operation research*, Vol 4:1, pp 35-45.

Berg. G. D., Wadhwa. S., (2002). Diabetes disease management in a community-based setting (Structured abstract). *Manag Care*, Vol 11, pp 42–50.

Becker. H. and Stuifbergen. A. K., (2004). 'What makes it so hard? Barriers to health promotion experienced by people with multiple sclerosis and polio*.' Family and community health*, Vol 27:1, pp 75-85.

Becker. H., Stuifbergen. A. K., Ingalsby. K., Sands. D., (1989). 'Health promoting attitudes and behaviours among persons with disabilities.' *International Journal of Rehabilitation Research*, Vol 12:3, pp 235-250.

Becker. H. Stuifbergen. A. K., and Sands. D., (1991). 'Development of a scale to measure barriers to health promotion activities among persons with disabilities.' *American Journal of Health Promotion,* Vol 5:6, pp 449-454.

Benowitz. N. L., (2010). Nicotine Addiction. *New English Journal of Medicine,* Vol 362, pp 2295-2303.

Berks. D., Hoedjes. M., Raat. H., Franx. A., Looman C. W. N., Van Oostwaard. M. F., Papatsonis. D. N. M., Duvekot. J. J., Steegers. E. A. P., (2019). Feasibility and Effectiveness of a lifestyle intervention after complicated pregnancies to improve risk factors for future cardiometabolic disease. *International Society for the study of Hypertension in Pregnancy,* pp 98-107.

Biddle. S. J. H., Fox. K., Boutcher. S., (2003). Physical Activity and Psychological well-being. 3rd edition. *Routledge an imprint of Tailor and Fransis Group. London and New York,* pp 88-94.

Bisogni. C. A., Jastran, M. R. D., Seligson. M., Thompson. A., (2012). How People Interpret Healthy Eating: Contributions of Qualitative Research, *Journal of Nutrition education and Behavior,* Vol 44, pp 282-301.

Braun. V. & Clarke. V., (2006). Using thematic analysis in psychology, *Qualitative Research in Psychology,* Vol 3:2, pp 77-101.

Bukman. A. J., Teuscher. D., Feskens. E. J. M., van Baak. M. A., Meershoek. A., Renes. R. J., (2014). Perceptions on healthy eating, physical activity, and lifestyle advice: opportunities for adapting lifestyle interventions to individuals with low socioeconomic status. *BMC Public Health,* 14:1036, pp 1-11.

Cannuscio. C. C., Hillier. A., Karpyn. A., Glanz. K., (2014). The social dynamics of healthy food shopping and store choice in an urban environment, *Social Science & Medicine,* Vol 122, pp 13-20.

Cape Town Suburb Map." *Ontheworldmap.Com*, (2012), [online] ontheworldmap.com/southafrica/city/capetown/cape-town-suburb-map.html. [Accessed 5 Oct. 2019.]

Cecchini. M., Sassi. F., Lauer. J. A., Lee. Y. Y., Gaujardo-Barron. V., Chisholm. D., (2010). Tacking of unhealthy diets, physical inactivity, and obesity: Health effect and cost effectiveness. *Lancet*, Vol 376, pp 1775-1784.

Cohen. S., Janicki-Deverts. D., Miller. G. E., (2007). Psychological Stress and Disease. *Journal of American Medical Association.* Vol 298:14, pp 1685–1687.

Copeland. L., (2003). An exploration of the problems faced by young women living in disadvantaged circumstances if they want to give up smoking: can more be done at general practice level? *Family Practice*, Vol 20:4, pp 393–400.

Curry. S. J., Grothaus. L., McBride. C., (1997). Reasons for quitting: Intrinsic and extrinsic motivation for smoking cessation in a population-based sample of smokers, *Addictive Behaviours*, Vol 22:6, pp 727-739.

Czernichow. S., Kengne A.-P., Stamatakis. E., Hamer. M., Batty. G. D., (2011). Body mass index, waist circumference and waist–hip ratio: which is the better discriminator of cardiovascular disease mortality risk? Evidence from an individual-participant meta-analysis of 82864 participants from nine cohort studies, *Obesity Reviews*, Vol 12, pp 680-687.

Damiani. G., Federico. B, Bianchi. C. B. N. A., Ronconi. A., Basso. D., Fiorenza. S., Sassi. F., (2011). Socio-economic status and the prevention of cardiovascular disease in Italy: evidence from a national health survey. *European Journal of Public Health,* Vol 21, pp 591-596.

Heart and Stroke Foundation, 'CARDIOVASCULAR DISEASE (2016). Cardiovascular Disease Statistics, *Heart and Stroke Foundation South Africa*, pp 1-6.

Department of Health Republic of South Africa., (2015). Ethics in Health Research: principles, processes and Structure. *DoH Republic of South Africa, Second Edition*, pp.14-17.

De Wit. J. B. F., Marijn Stok. J., Smolenski. D. J., De Ridder. D. D. T., De Vet. E., Gaspar. T., Johnson. F., Nureeva. L., Luszczynska. A., (2015). Family Meal Culture and Self-Regulation. *Applied Psychology: Health and Well-Being*, Vol 7, pp 22-40.

Devine. C. M., Sobal. J., Bisogni. C. A., Connors. M., (1999). Food Choices in Three Ethnic Groups: Interactions of Ideals, Identities, and Roles, *Journal of Nutrition Education*, Vol 31:2, pp 86-93.

Fiogbé. E., Aho. S., Kiki. G., (2017). 'An Overview of Exercise Training in Cardiac Rehabilitation Programs in Sub-Saharan Africa: A Systematic Review', *International Journal of Medical Reviews*, Vol 4:3, pp. 86-90.

Foulds. J., and Ghodse. H., (1995). Treating Tobacco Dependence. *Advances in Psychiatric Treatment*, vol 1:4, pp 116-123.

Gaziano, T. A., (2007). 'Reducing the growing burden of cardiovascular disease in the developing world', *Project Hope – the people-to-people Health Foundation, Inc*, Vol 26:1, pp 13–24.

Giskes. S. J., and Turrell. G., (2011). Socio-economic differences in weight control behaviors and barriers to weight control. *Public Health Nutrition*, Vol 14, pp 1768-1778.

Glezeva. N., Chisale. M., McDonald. K., Ledwidge. M., Gallagher. J., Watson. C. J., (2018). Diabetes and complications of the heart in Sub-Saharan Africa: An urgent need for improved awareness, diagnostics and management. *Elsevier Incorporated*, Diabetes Research and Clinical Practice, Vol 137, pp 10-19.

Golafshani, N., (2003). Understanding reliability and validity in qualitative research. *The qualitative report*, Vol 8:4, pp 597-606.

Goudge. J., Gilson. L., Russell. S., Gumede. T., Mills. A., (2009). Affordability, availability and acceptability barriers to health care for the chronically ill: Longitudinal case studies from South Africa. *BMC Health Serv*. Res. 9, 75.

Grothe. K. B., Roach. J., Low. A., Himes. S., Craft. J. M., Norman. G. J., Dubbert. P. M., (2013). Sedentary Behavior and Food Cravings in Diverse Overweight Women: A Pilot Study, *Women & Health*, Vol 53:4, pp 405-418.

Hamilton. J., Fawson. S., May. J., Andrade. J., Kavanagh. D. J., (2013). Brief guided imagery and body scanning interventions reduce food cravings, *Appetite*, Vol 71, pp 158-162.

Hoevenaar-Blom. M. P., Spijkerman A. M. W., Kromhout. D, Van den Berg. J. F., Verschuren M. W. M., (2011). Sleep Duration and Sleep Quality in Relation to 12-Year Cardiovascular Disease Incidence: The MORGEN Study, *Sleep*, Vol 34:11, pp 1487–1492.

Im E-O, Chang SJ, Chee W, Chee. E., (2013). Attitudes of women in midlife to web-based interventions for promoting physical activity. *Journal of Midwifery and Womans Health* Vol 18, pp 419–422.

Johnson. D., Alexander. G., Kapke. A., McClure. J., Wiese. C., Greene. S., Strecher. V., (2009). The relationship of social support and smoking cessation among African Americans enrolled in the Project Quit Study, *Clinical Research and Medicine*, Vol 137 pp PS1-PS28.

Johnston. T. P., Korolenko. T. A., Pirro.M., Sahebkar. A., (2017). Preventing cardiovascular heart disease: Promising nutraceutical and non-nutraceutical treatments for cholesterol management, *Pharmacological Research*, Vol 120, pp 219-225.

Kelly, S., Martin. S., Kuhn. I., Cowan. A., Brayne. C., Lafortune. L., (2016). 'Barriers and facilitators to the uptake and maintenance of healthy behaviours by people at mid-life: A rapid systematic review', *PLoS ONE*, Vol 11:1, pp 1–26.

Kim. Y., (2010). The Pilot Study in Qualitative Inquiry: Identifying issues and Learning Lessons for Culturally Competent Research, *SAGE Publications*, Vol 10:2, pp 190-206.

Khera. A. V., Emdin. C. A., Phil. D., Drake. I., Natarajan. P., Bick. A. G., Cook. N. R., Chasman. D. I., Baber. U., Mehran. R., Rader. D. J., Fuster. V., Boerwinkle. E., Melander. O., Orho-Melander. M., Ridker. P. M., Kathiresan. S., (2016). Genetic risk,

adherence to healthy lifestyle, and coronary disease. *N Engl J Med,* Vol15:375(24), pp 2349-2358.

Khanji. M. Y., van Waardhuizen. C. N., Bicalho. V. V. S., Ferket. B. S., Myriam Hunink. M. G., Petersen. S. E., (2018). Lifestyle advice and interventions for cardiovascular risk reduction: A systematic review of guidelines. *International Journal of Cardiology,* Vol 263, pp 142-151.

Klein. H. D., McCormack. L. A., Drooger. A., Meendering. J. R., (2019). Barriers to and facilitators of weight managementin adults using meal replacement program that includes health coaching. *Journal of Primary Care and Community Health,* SAGE Publishers, pp 1-8.

Koster. A., Leitzmann. M. F., Schatzkin. A., Mouw. T., Adams. K. F, Van Eijk. J. Th. M., Hollenbeck. A. R., Harris. T. B., (2008). Waist Circumference and Mortality, *American Journal of Epidemiology,* Vol 167:12, pp 1465–1475.

Lawlor, E., Bradley, D., Cupples, M., Tully, M., (2018). The effect of community-based interventions for cardiovascular disease secondary prevention on behavioural risk factors, *Prev. Med,* Vol 114, pp 24–38.

Lindwall. M., (2004). Exercising the self: on the role of exercise, gender and culture in physical self-perceptions, *Stockholm University, Departement of Psychology,* pp 1-148.

Mabuza. L. H., Govender. I., Ogunbanjo. G.A., Mash. B., (2014). African Primary Care Research: Qualitative data analysis and writing results. *Afr J Prm Health Care Fam Med*. Vol 6:1, pp 1-5.

Magobe. N. B. D., Poggenpoel. M., Myburgh. C., (2019). Experience of patients with hypertension at primary health carein facilitating own lifestyle change of regular physical activity. *Curationis.* AOSIS Vol 40:1, pp 1-8.

Masana. L., Ros. E., Sudano. I., Angoulvant. D., and the Lifestyle expert working group., (2017). Is there a role for lifestyle changes in cardiovascular prevention? What, when and how? *Artherosclerosis Supplements,* Vol 26, pp 2-15.

Massyn. N., Padarath. A., Peer. N., Day. C., (2017). District Health Barometer 2016/17. *Health Systems Trust,* South Africa, pp 1-839.

Mayosi. B. M., (2014). The 10 'Best Buys' to combat heart disease, diabetes and stroke in Africa. *Heart BMJ Group* 99, pp 973-974.

Mendis. S., and Chestnov. O., (2013). Costs, Benefits, and Effectiveness of Interventions for the Prevention, Treatment, and Control of Cardiovascular Diseases and Diabetes in Africa. *Elsevier Incorporated,* Progress in Cardiovascular Disease, Vol 56, pp 314-321.

Mensah. G. A., (2013). Descriptive Epidemiology of Cardiovascular Risk Factors and Diabetes in Sub-Saharan Africa. *Elsevier Incorporated,* pp 240-250.

Messerli. F. H., Rimoldi. S. F., Bangalore. S., (2018). The Transition Form Hypertension to Heart Failure (contemporary update), *Journal of the American College of Cardiology,* Vol 5:8, pp 543-551.

Messner. B. and Bernhard. D., (2014). Smoking and Cardiovascular Disease: Mechanisms of Endothelial Dysfunction and Early Atherogenesis, *Journal of Arteriosclerosis, Thrombosis, and Vascular Biology,* Vol 34, pp 509-515.

McGuire. A. M., Anderson. D. J., Fulbrook. P., (2014). 'Percieved barriers to healthy lifestyle activities in midlife and older Australian woman with type 2 diabetes.*' Collegian*, Australia, Vol 21, pp 301-310.

Mitchell. S., Malanday. B., Damascenoz. A., Eckelx.R. H., Gaitak. D., Kotseva. K., Januzzi. J. L., Mensahyy. G., Plutzkyzz. J., Prystupiukxx. M., Rydenkk. L., Thierer. J., Virani. S. S., Sperling. L., (2019). A Roadmap on the Prevention of Cardiovascular Disease Among People Living With Diabetes. *Global Heart Federation,* Vol 14:3, pp 215-240.

Molloy, G.J., Dixon, D., Hamer, M., Sniehotta, F.F., (2010). Social support and regular physical activity: Does planning mediate this link?. *British Journal of Health Psychology*, Vol 15, pp 859-870.

Nanchahal. K., Ashton. W. D., Wood. D. A., (2000). Alcohol consumption, metabolic cardiovascular risk factors and hypertension in women, *International Journal of Epidemiology*, Vol 29:1, pp 57–64.

Nielsen. J. B., Leppin. A., Gyrd-Hansen. D. E., Jarbøl. D. E., Søndergaard. J., Larsen. P.V. (2017). 'Barriers to lifestyle changes for prevention of cardiovascular disease - a survey among 40-60-year old Danes', *Biomed Centre Open Access*, Vol 17:1, pp 1–8.

Noble. H. & Smith. J., (2015). Issues of Validity and Reliability in Quantitative Research. *Evidence Based Nursing. BMJ Publishing Group Ltd.* Vol 18, pp 34-35.

O'Flaherty. M., Buchan. I., Capewell. S., (2013). Contributions of treatment and lifestyle to declining CVD mortality: why have CVD mortality rates declined so much since the 1960s?, *Heart*, Vol 99, pp 159-162.

O'Leary, Z., (2017). *The essential guide to doing your research project.* 3rd edition. London. *SAGE Publishing Ltd*.

Opdenakker. R., (2006). Advantages and Disadvantages of Four Interview Techniques in Qualitative Research. *Forum: Qualitative Social Research*, Vol 7:4, pp 1-13.

Oyeyemi, A.L., Adegoke, B.O., Sallis, J.F., Oyeyemi. A. Y., De Bourdeaudhuij. I., (2012). Perceived crime and traffic safety is related to physical activity among adults in Nigeria. *BMC Public Health*, Vol 12:294, pp 1-11.

Papatheodorou. K., Banach. M., Bekiari. E., Rizzo. M., Edmonds. M., (2018). Complications of Diabetes 2017, *Journal of Diabetes Research*, Vol 2018, pp 1-4.

Perri. 6. & Bellamy. C., (2012). Principles of Methodology: Research Design in Social Science. London. *SAGE Publishing Ltd.*

Piepoli. M. F., Hoes. A. W., Agewall. S., Albus. C., Brotons. C., Catapano. A. C., Cooney. M-T., Corrà. U., Cosyns. B., Deaton. C., Graham. I., Hall. M. S., Hobbs F. D. R., Løchen. M-L., Löllgen. H., Marques-Vidal. P., Perk. J., Prescott. E., Redon. J., Richter. D. J., Sattar. N., Smulders. Y., Biberi. M., van der Worp. H. B., van Dis. I., Verschuren. M. W. M.,

(2016). European Guidelines on Cardiovascular Disease Prevention in Clinical Practice, *Elsevier Ireland Ltd*, Vol 20:6, pp 207-274.

Reamy. B. V., Williams. P. M. and Kuckel. D. P., (2018). 'Prevention of Cardiovascular Disease', Primary Care - Clinics in Office Practice, *World Health Organization*, Vol 45:1, pp 25–44.

Reid. S. and Marsh. B., (2014). African Primary Care Research: Qualitative interviewing in primary care, South Africa, *AOSIS.*

Richard. A., Meule. A., Julia Reichenberger. J., Blechert. J., (2017). Food cravings in everyday life: An EMA study on snack-related thoughts, cravings, and consumption, *Appetite*, Vol 113, pp 215-223.

Sacco. R. L.**,** Roth. G. A., Reddy. S., Arnett. D. K., Bonita. R., Gaziano. T. A., Heidenreich. P., Huffman. M. D., Mayosi. B. M., Mendis. S., Murray. C. J. L., Perel. P., Piñeiro. D. J., Smith. S. C., Taubert. K. A., Wood. D. A., Zhao. D., and William A. Zoghbi. W. A., (2016). 'The Heart of 25 by 25: Achieving the Goal of Reducing Global and Regional Premature Deaths From Cardiovascular Diseases and Stroke: A Modeling Study From the American Heart Association and World Heart Federation', *The American Heart Association and World Heart Federation,* Vol 133:23, pp e674–e690.

Sampson. U. K. A., Amuyunzu-Nyamongod. M., Mensah. G. A., (2013). Health Promotion and Cardiovascular Disease Prevention in Sub-Saharan Africa. *Elsevier Incorporated*, Progress in Cardiovascular disease, Vol 56, pp 344-355.

Sarris. J., O'Neil. A., Coulson. C.E., Schweitzer. I., Berk. M., (2014). Lifestyle medicine for depression. *BMC Psychiatry* Vol 14:107, pp 1-13.

Siddiqi. Z., Tiro. J. A., Shuval. K., (2011). Understanding impediments and enablers to physical activity among African American adults: a systematic review of qualitative studies. *Health Education Res*, Vol 26, pp 1010–1024.

Sliwa. K. and Ntusi. N., (2019). 'Battling Cardiovascular Diseases in a Perfect Storm', *Circulation, American Heart Association*, Vol 139:14, pp 1658–1660.

Song-Ming. DU, Guan-Sheng MA, Yan-Ping LI, Hong-Yun FANG, Xiao-Qi HU, Xiao-Guang YANG, Yong-Hua HU., (2010). Relationship of Body Mass Index, Waist Circumference and Cardiovascular Risk Factors in Chinese Adult, *Biomedical and Environmental Sciences*, Vol 23:2, pp 92-101.

Spinks. C., (2001). A New Apartheid? Urban Spatiality, (fear of) Crime, and Segregation in Cape Town, South Africa, *The London school of economics*, pp 1-42.

Statistics South Africa., (2015). *Main Place | Statistics South Africa*. [online] Statssa.gov.za. Available at: http://www.statssa.gov.za/?page_id=4286&id=303 [Accessed 22 Oct. 2019].

Steyn. K., de Wet. T., Richter. L., Cameron. N., Levitt. N. S., Morrell. C., (2000). Cardiovascular disease risk factors in 5-year-old urban South African children – the Birth to Ten Study. *South African Medical Journal*, Vol 90:7, pp 719-726.

Tawalbeh, L. I., Tubaishat. A., Batiha. A.M., Al-Azzam. M., AlBashtawy. M., (2015). 'The Relationship Between Social Support and Adherence to Healthy Lifestyle Among Patients with Coronary Artery Disease in the North of Jordan', *Clinical Nursing Research*, SAGE Vol 24:2, pp 121–138.

Taylor. J., MSN., FNP-BC., (2020). Looking beyond lifestyle: A comprehensive approach to the Treatment of Obesity in the Primary Care Setting. *Journal of Nurse Practioners*, Vol 16, pp 74-78.

The World Bank Group., (2021). *Middle income Data*. [online] Data.worldbank.org. Available at: <https://data.worldbank.org/income-level/middle-income> [Accessed 26 February 2021].

Thomas, H., Daimond. J., Vieco. A., Chaudhuri. S., Shinnar. E., Cromer. S., Perel. P., Mensah. G. A., Narula. J., Johnson. C. O., Roth. G. A., Moran. A. E., (2018). 'Global Atlas of Cardiovascular Disease 2000-2016: The Path to Prevention and Control', Global Heart, *World Health Organization*. Vol 13:3, pp 143–163.

Tolnai, N., Szabó. Z., Köteles. F., Szabo. A., (2016). 'Physical and psychological benefits of once-a-week Pilates exercises in young sedentary women: A 10-week longitudinal study', *Physiology & behavior*, 163, pp 211–218.

United Nations., (2015). Transforming Our World: The 2030 Agenda for Sustainable Development, *United Nations*, A/RES/70/1, pp 1-41.

Vaughn. S., (2009). Factors influencing the participation of middle-aged and older Latin-American women in physical activity: a stroke-prevention behavior. *Accossiation of Rehabilitation,* Vol 34, pp 17–23.

Vitiello. M. V., (2006). Sleep, Alcohol and Alcohol Abuse, *Society for the Study of Addiction,* Vol 2:2, pp 151-158.

Vgontzas. A. N., Bixler. E. O., Chrousos. G. P., Pejovic. S., (2008). Obesity and sleep disturbances: Meaningful sub-typing of obesity, *Archives of Physiology and Biochemistry*, Vol 114:4, pp 224-236.

Wang. Y., and Xu. D., (2017). Effects of Aerobic Exercise on Lipids and Lipoproteins, *Lipids in health and Disease,* Vol 16:132, pp 1-8.

Wardle. J., and Steptoe. A., (2003). Socioeconomic differences in attitudes and beliefs about health lifestyles. *Journal of Epidemiol Community Health,* Vol 57, pp 440-443.

Webster, R., & Heeley, E., (2010). Perceptions of risk: understanding cardiovascular disease. *Risk management and healthcare policy*, Vol 3, pp 49–60.

World Heart Federation., (2021). *Risk factors - World Heart Federation*. [online] Available at: https://www.world-heart-federation.org/resources/risk-factors/ [Accessed 1 Aug. 2021].

World Health Organisation., (2014). Global Status Report on noncommunicable diseases 2014 "Attaining the nine global noncommunicable disease targets; a shared responsibility*,"* *World Health Organisation,* pp 1-298.

World Health Organisation., (2011). Global Atlas on cardiovascular disease prevention and control. *World Health Organisation,* pp 1-115.

World Health Organisation., (2007). Prevention of Cardiovascular Disease Guidelines for assessment and management of cardiovascular risk, *World Health Organisation*, pp 1-92.

World Health Organisation, (2021). *Cardiovascular disease,* World Health Organisation [viewed on 05/01/2021], available at https://www.who.int/health-topics/cardiovascular-diseases/#tab=tab_1 [online]

World Health Organisation., (2021). *Hypertension,* World Health Organisation [viewed on 05/01/2021], available at https://www.who.int/news-room/fact-sheets/detail/hypertension [online].

Centres for Disease Control and Prevention., (2020). *The Health effects of Overweight and Obesity,* U.S Department of Health and Human Services [viewed on 07/01/2021], available at https://www.cdc.gov/healthyweight/effects/index.html [online].

Zvolensky. M. J., Vujanovic. A. A., Bonn Miller, M. O., Bernstein. A., Yartz. A. R., Ph.D., Gregor. K. L., McLeish. A. C., Marshall. E. C., Gibson L. E., (2007). Incremental Validity of Anxiety Sensitivity in Terms of Motivation to Quit, Reasons for Quitting, and Barriers to Quitting Among Community-Recruited Daily Smokers, *Nicotine & Tobacco Research*, Vol 9:9, pp 965–975.

9. Appendices

9.1 Appendix A

What barriers to lifestyle modifications do persons aged 35-55 identified at moderate risk for CVD experience in a middle income community in the Northern & Blaauwberg suburbs of Cape Town?

Research by Stephanie Sawyer under the University of Stellenbosch

Aims and objectives

The aim of this study is to explore the barriers to lifestyle modifications experienced by persons aged 35-55 years, identified at moderate risk for CVD, who access private health care facilities in the Blaauwberg suburb of Cape Town.

The objectives of this study are

- To explore participants current practices in terms of lifestyle
- To explore participants knowledge on the role of lifestyle modification in CVD
- To explore the challenges to lifestyle modification participants experience.

WHY YOU?

- You live in Blaauwberg suburbs of cape Town
- You are aged 35-55 years
- You have 2 or more risk factors for cardiovascular disease (see above)

No financial compensation for participation

For more information contact Stephanie Sawyer on 0832729019 or stephsawyer2271@gmail.com

9.2 Appendix B

List of Facebook pages to post advert:

- Table view Neighbours
- Sunningdale Neighbours
- Melkbosstranders
- Table View
- Milnerton Neighbours
- Table view neighbours original
- Sunningdale moms
- Community first network
- Parklands noticeboard
- Sunningdale noticeboard
- The Local – melkbosstrand
- Neighbours-tableview
- Melkbosstrand noticeboard
- Tableview out and about
- Milnerton out and about
- Milnerton advertising
- West coast buy and sell
- The real melkbosstranders
- Classified ads – parklands, Sunningdale, tableview
- Table view advertising
- Melkbos classifieds
- Melkbos ads
- Blouberg noticeboard
- Bloubergstand/Milnerton/Sunningdale/melkbos business
- Blouberg community
- Table view classifieds

9.3 Appendix C

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF RESEARCH PROJECT:	
Cardiovascular Disease: Exploring the barriers to lifestyle modification in a Cape Town setting.	
DETAILS OF PRINCIPAL INVESTIGATOR (PI):	
Title, first name, surname: **Stephanie Sawyer**	**Ethics reference number:** S19/10/265
Full postal address: 5 Madison Square Gardens, 53 Regent Road Parklands Cape Town 7441	**PI Contact number:** **0832729019**

I would like to invite you to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask me any questions about any part of this project that you do not fully understand. It is very important that you are completely satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. In other words, you may choose to take part, or you may choose not to take part. Nothing bad will come of it if you say no: it will not affect you negatively in any way whatsoever. Refusal to participate will involve no penalty or loss of benefits or reduction in the level of care to which you are otherwise entitled to. You are also free to withdraw from the study at any point, even if you do agree to take part initially.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University.** The study will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, the South African Guidelines for Good Clinical Practice (2006), the Medical Research Council (MRC) Ethical Guidelines for Research (2002), and the Department of Health Ethics in Health Research: Principles, Processes and Studies (2015).

What is this research study all about?

- *I am conducting this study in the Blaauwberg suburb of Cape Town. An interview will be arranged with each person individually at a time and location convenient to you. The number of expected participants for this study are between 15-20 individuals*

The aim of this study is to explore the barriers to lifestyle modifications experienced by persons aged 35-55 years, identified at moderate risk for CVD, who access private health care facilities in the Blaauwberg suburb of Cape Town.
The objectives are:

- *To explore participants current practices in terms of lifestyle*
- *To explore participants knowledge on the role of lifestyle modification in CVD*
- *To explore the challenges to lifestyle modification participants experience.*

Why do I invite you to participate?

Before change can occur, we need to understand what needs to change. I am conducting this study to help find out what areas of prevention and rehabilitation we can improve for those at risk for cardiovascular disease in South Africa. I want to help promote a healthy lifestyle and help people live a life free of the burden of cardiovascular disease and its risk factors.

I am inviting you to participate in this study because you have 2 risk factors for cardiovascular disease, and you could provide relevant information about your experiences with trying to modify and maintain a healthy lifestyle.

What will your responsibilities be?

- *You are expected to engage in an interview with me at a time and venue that is convenient to you. This study is reliant on you providing truthful and detailed information about your lifestyle and experiences of lifestyle modification...*

Will you benefit from taking part in this research?

- *There may not be any personal benefits from your participation in this study, however the study may give insight to health care providers about barriers experienced with lifestyle modification. This in turn could lead to further studies to implement changes to improve lifestyle modification.*

Are there any risks involved in your taking part in this research?

- *You will not undertake any physical, psychological or spiritual harm while participating in this study. Your welfare is my top priority. You have the right to withdraw from the study at any point without consequence to you, you also have the right not to answer any questions that make you uncomfortable. In the interview, you will be asked about your lifestyle and your personal barriers to lifestyle modification.*

If you do not agree to take part, what alternatives do you have?

- *You have the right not to participate. should this be the case, I can provide referral information for other health care professionals that can assist with lifestyle modification if requested.*

Who will have access to your medical records?

- *Your medical records are not required for this research. However, any personal information and personal experience will be kept confidential. The recordings and transcripts from the interviews will be accessed by myself, and my peers and supervisors at the University of Stellenbosch during data analysis and discussions. All recordings and transcripts will be destroyed two years after publishing.*

Even though it is unlikely, what will happen if you get injured somehow because you took part in this research study?

- Stellenbosch University will provide comprehensive no-fault insurance and will pay for any medical costs that came about because participants took part in the research (either because the participant used the medicine in this study or took part in another way). The participant will not need to prove that the sponsor was at fault.

Will you be paid to take part in this study and are there any costs involved?

- There should be no costs incurred to yourself while participating in this study.
- You will NOT be compensated to take part in the study

Is there anything else that you should know or do?

- You can phone Stephanie Sawyer at 0832729019 if you have any further queries or encounter any problems.
- You can phone the Health Research Ethics Committee at 021 938 9677/9819 if there still is something that your study doctor has not explained to you, or if you have a complaint.
- You will receive a copy of this information and consent form for you to keep safe.

Declaration by participant

By signing below, I ……..…… agree to take part in a research study entitled "*What barriers to lifestyle modifications do persons aged 35-55*

identified at moderate risk for CVD experience in a middle-income community in the Blaauwberg suburb of Cape Town."

I declare that:

- I have read this information and consent form, or it was read to me, and it is written in a language in which I am fluent and with which I am comfortable.
- I have had a chance to ask questions and I am satisfied that all my questions have been answered.
- I understand that taking part in this study is **voluntary,** and I have not been pressurised to take part.
- I may choose to leave the study at any time and nothing bad will come of it – I will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan that we have agreed on.

Signed at (*place*) .....…….. on (*date*) ……...…….. 20...

....

Signature of participant **Signature of witness**

Declaration by investigator

I *(name)* ……..…… declare that:

- I explained the information in this document in a simple and clear manner to ……..
- I encouraged him/her to ask questions and took enough time to answer them.
- I am satisfied that he/she completely understands all aspects of the research, as discussed above.
- I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.)*

Signed at (*place*) .....…..…….. on (*date*) ……...…….. 20….

.....	.....
Signature of investigator	**Signature of witness**

9.4 Appendix D

Interview schedule

Demographics:

1. Date of Birth:
2. Gender:
3. What are your CVD Risk factors/medical conditions?

Questions & prompts:

1. What is your understanding of cardiovascular/heart disease?
2. What is your understanding of cardiovascular risk factors?
    a. Can you elaborate?
3. What role does your lifestyle play in managing your risk for cardiovascular /heart disease?
    a. Can you elaborate?
    b. Can you give me an example from your personal experience?
    c. So, in summary what you said is…
4. What effect has been diagnosed with risk factors for CVD had on your life?
    a. Can you give some examples from your personal experiences?
    b. Can you elaborate
    c. So, in summary you said…
5. Which aspects of a modified lifestyle are easy for you to achieve?
    a. Can you provide more information?
    b. In summary you said.
6. Which aspects of lifestyle modification do you struggle with?
    a. Can you provide more information?
    b. In summary you said
7. What helps you to modify your lifestyle?
    a. Can you provide examples from your personal experience?
    b. In summary you said
8. What hinders modification of your lifestyle?
    a. Can you provide examples from your personal experience?
    b. In summary you said

9.5 Appendix E

Barriers to Lifestyle Modification				
Physical Activity				
Health/quality of life	**Sociocultural Factors**	**Physical Environment**	**Access to Facilities and resources**	**Psychological Factors**
physical ailments or other chronic conditions.	Lack of time; Lack of knowledge; Self-consciousness/ social concerns.	Safety concerns; Driving instead of walking; Weather.	Financial cost; transport; lack of availability to community physical activity programs or facilities.	Lack of Motivation; Low self-efficiency; perception of lack of capability; Entrenched attitudes and behaviours.
Eating Habits				
Health/quality of life	**Sociocultural Factors**	**Physical Environment**	**Access to Facilities and resources**	**Psychological Factors**
Side effects of medications for co-existing conditions.	social environment around food; eating out of home; preparation; competing responsibilities; unplanned shopping; other unhealthy lifestyle behaviours.		Financial cost; lack of confidence in resources and professionals; convenience of shops; and presentation of food in shops.	Lack of motivation; Existing entrenched behaviours and attitudes; coping mechanisms associated to stress.
Smoking				
Health/quality of life	**Sociocultural Factors**	**Physical Environment**	**Access to Facilities and resources**	**Psychological Factors**
Age of initiating smoking; side effects of treatment options.	Social environment around smoking; other unhealthy lifestyle behaviours.			Perceived psychological attachment to smoking; increased stress and anxiety without cigarettes; peer pressure.

9.6 Appendix F

facilitators to Lifestyle Modification				
Physical Activity				
Health/quality of life	**Sociocultural Factors**	**Physical Environment**	**Access to Facilities and resources**	**Psychological Factors**
Enjoyment; sense of wellbeing; quality of life; stress release.	support of a group or partner.	Enjoy the outdoors.	Access to professional assistance.	easy to achieve because of entrenched behaviours and attitudes.
Eating Habits				
Health/quality of life	**Sociocultural Factors**	**Physical Environment**	**Access to Facilities and resources**	**Psychological Factors**
Sense of wellbeing and weight loss.	Support of a group, partner, or professional.	None.	Easy to access information. People should be educated at a younger age.	Easy to achieve because of entrenched behaviours and attitudes; psychological adaptation and strength.
Smoking				
Health/quality of life	**Sociocultural Factors**	**Physical Environment**	**Access to Facilities and resources**	**Psychological Factors**
None.	Support group, partner.	None.	Information is readily available. Anti-smoking products are easily available.	Mental forte.

9.7 Appendix G

UNIVERSITEIT STELLENBOSCH UNIVERSITY

Approval Notice

New Application

09/04/2020

Project ID :13000

HREC Reference No: S19/10/265

Project Title: Cardiovascular Disease: Exploring the barriers to lifestyle modification in a Cape Town Setting

Dear Miss Stephanie Sawyer

We refer to your response to modifications received on 11/03/2020. Please be advised that your submission was reviewed and approved by members of **Health Research Ethics Committee** via **expedited** review procedures on 09/04/2020.

Please note the following information about your approved research protocol:

Protocol Approval Date: 09 April 2020

Protocol Expiry Date: 08 April 2021

Proviso:

Kindly note that although the study has been granted ethics approval, the study may not proceed during the current national lockdown as an embargo has been placed on studies that require interaction with research participants in order to prevent potential harm to participants. HREC will publish on the HREC website a date when the said embargo is to be lifted taking into consideration the best interest of participants and national interests around COVID-19.

Please remember to use your Project ID 13000 and Ethics Reference Number S19/10/265 on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review

Translation of the informed consent document(s) to the language(s) applicable to your study participants should now be submitted to the HREC.

Please note you can submit your progress report through the online ethics application process, available at: Links Application Form Direct Link and the application should be submitted to the HREC before the year has expired. Please see *Forms and Instructions* on our HREC website (www.sun.ac.za/healthresearchethics) for guidance on how to submit a progress report.

The HREC will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (Western Cape Departement of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Government website for access to the online Health Research Approval Process, see: https://www.westerncape.gov.za/general-publication/health-research-approval-process Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and instructions, please visit: Forms and Instructions on our HREC website https://applyethics.sun.ac.za/ProjectViewIndex/13000

If you have any questions or need further assistance, please contact the HREC office at 021 938 9657.

Yours sincerely,

Mrs. Melody Shana

Coordinator